

IN THE CLAIMS

Please amend the following claims which are pending in the present application:

C 1-6. (Cancelled)

7. (Currently amended) An apparatus comprising:

a package substrate having top and bottom ~~surface~~ buildup layers, including a plurality of conductive traces formed therein, disposed on a thermally conductive substrate core, wherein a portion of the substrate core is exposed at a top surface of the package substrate for attachment of a heat spreader.

8. (Original) The apparatus of claim 7, wherein the exposed portion of the substrate core extends around the perimeter of the top surface buildup layers.

9. (Original) The apparatus of claim 7, wherein the substrate core is made of metal.

10. (Currently amended) An apparatus comprising:

a package substrate including a thermally conductive substrate, having ~~top and bottom surface~~ first and second portions, and a buildup layer[[s]] being

disposed on a ~~thermally conductive~~ only the first portion of the substrate core

an integrated circuit having a top surface and a backside surface, the integrated circuit mounted ~~on a first surface of~~ to the package substrate with the top surface of the integrated circuit facing the package substrate; and

a heat spreader ~~thermally connected to an exposed portion~~ mounted to the second portion of the substrate core, a bottom surface of the heat spreader thermally coupled to the backside surface of the integrated circuit.

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11. (Original) The apparatus of claim 10, wherein the heat spreader is thermally coupled to a perimeter portion of the substrate core.

12. (Original) The apparatus of claim 10, wherein the heat spreader is soldered to the substrate core.

13. (Original) The apparatus of claim 10, wherein the heat spreader is made of metal.

14. (Original) The apparatus of claim 10, wherein the substrate core is made of metal.

15. (Original) The apparatus of claim 10, comprising a thermal interface material disposed between the backside surface of the integrated circuit and the bottom surface of the heat spreader.

16. (Original) The apparatus of claim 10, comprising a heat sink attached to a top surface of the heat spreader.

17. (Original) The apparatus of claim 16, comprising a fan attached to the heat sink.

18. (Original) The apparatus of claim 10, wherein the integrated circuit is mechanically and electrically coupled to the package substrate by a plurality of solder bump interconnections.

19. (Original) The apparatus of claim 18, comprising a printed circuit board, wherein the package substrate is mounted on the printed circuit board.

20. (Original) The apparatus of claim 19, wherein the package substrate is mechanically and electrically coupled to the printed circuit board by a plurality of solder bump interconnections.

21. (Currently amended) An apparatus comprising:

a package substrate including a thermally conductive substrate, having ~~top~~
~~and bottom surface~~ first and second portions, and a buildup layer[[s]] being
disposed on a ~~thermally conductive~~ only the first portion of the substrate core;

at least two integrated circuits having top surfaces and a backside surface, the
integrated circuits mounted ~~on a first surface of~~ to the package substrate with the
top surfaces of the integrated circuits facing the package substrate; and

CI a heat spreader ~~thermally coupled~~ mounted to an ~~exposed~~ the second portion
of the substrate core, wherein a surface of the heat spreader is thermally connected
to the backside surfaces of the at least two integrated circuits.

22. (Original) The apparatus of claim 21, comprising one or more capacitors
mounted on a top surface of the package substrate.

23. (Original) The apparatus of claim 21, wherein the heat spreader is soldered to
the substrate core.

24. (New) An Apparatus comprising:

a package substrate including a metal substrate core, having first and second
portions, and a buildup layer, having a plurality of conductive traces formed
therein, disposed on the first portion of the substrate core;

an integrated circuit having a top surface and a backside surface, the integrated circuit mounted to the buildup layer with the top surface of the integrated circuit facing the package substrate; and

a heat spreader mounted to the second portion of the substrate core, a bottom surface of the heat spreader thermally coupled to the backside surface of the integrated circuit.

25. (New) The apparatus of claim 24, wherein the heat spreader is thermally coupled to a perimeter portion of the substrate core.

26. (New) The apparatus of claim 25, comprising a heat sink attached to a top surface of the heat spreader.
